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Abstract

Successful IT organizations are ones that can constantly transform themselves to adapt to the changing environment. Unlike the punctuated change in traditional organizations' transformation, IT organizations' transformation is often a continuous change where the existing and the new business coexist. The ability to simultaneous exploit the existing business while exploring the new business during organizational transformation, which we term transformation ambidexterity, has proven to a key success factor. This study intends to explore how IT organizations develop transformation ambidexterity. We conduct a comparative case study of four leading IT organizations that have just gone through a successful transformation and unveil four development approaches, namely partition, hybridization, self-extension, and self-generation. These four approaches are based on two primary dimensions of ambidexterity development: 1) development mechanism and 2) development path. We conclude with theoretical contributions to IS, organizational transformation and ambidexterity literature and with guidelines for IT and general managers to redeploy appropriate mechanisms and follow appropriate path for ambidexterity.

Keywords: IT Organizational Transformation, Ambidexterity, Case Study

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1 MOTIVATION

While transformation of a traditional organization is often a punctuated change, where the old business is quickly replaced by the new one (Newman 2000; Romanelli and Tushman 1994), transformation of an IT organization is often a continuous change, where the old and the new business coexist. When IBM transformed from an electromechanical equipment provider to an electronic equipment provider, it exploited the old business model around the electromechanical technology, while exploring a new business model around the electronic technology (Taylor and Helfat 2009). Similarly, when Infosys transformed from a software service provider to a consulting service provider, it exploited existing technical capabilities while exploring new capabilities in the consulting service (Garud et al. 2006).

Both organizations grew rapidly and profitably through the transformation. The simultaneous exploitative and exploratory activities played an important role in their success. We term this ability transformation ambidexterity. Ambidexterity refers to a special human ability to use both hands with dexterity. The concept has recently gained much research attention in the management literature, because it proves to be an effective theoretical lens to examine core managerial issues in many managerial research domains, such as strategic management (Rivkin and Siggelkow 2003), project management (Tiwana 2010), and innovation management (Atuahene-Gima 2005).

Our study intends to explore the different approaches toward ambidexterity during IT organizational transformation. Extent research has yet studied organizational transformation from the ambidexterity perspective, and has mainly taken the perspective of punctuated changes. The rising digital technologies have created a complex, super-connected and constantly-changing business environment, IT organizations operating in this environment need to constantly adapt to changes and maintain a balance of existing business and new business (McKelvey, et al. 2016). Organizations following punctuated changes are less likely to seize the prize of digital technologies.

Drawing upon the two concepts from the ambidexterity development literature, namely (1) development mechanism and (2) development path, we conduct a comparative case study of four leading IT organizations and unveil four different approaches toward ambidexterity, namely, partition, hybridization, self-extension and self-generation. The findings make several important theoretical contributions to IS and ambidexterity literature. First, to the IS literature, our findings provide a basis for further research into IT organizational transformation. Because of the turbulent environment, the ability to relentlessly transform and re-invent themselves has become a key characteristic of today's successful IT companies. Second, to the ambidexterity literature, Raisch et al. (2009) in their review paper have called for more search that explores the interactions between the development mechanisms and the development paths (p. 688). Our study answers that call by exploring how their interactions lead to ambidexterity.

2 LITERATURE REVIEW

Recent ambidexterity research has shifted the focus from understanding what is ambidexterity to how to develop ambidexterity. Encouraging this shift is a series of empirical studies that explore the association between ambidexterity and performance (e.g. Cao et al. 2009; He and Wong 2004). Although there are debates on whether ambidexterity is the best choice for organizations in a changing environment (e.g. Boumgarden et al. 2012; Gupta et al. 2006), the overall finding is that ambidexterity and organizational success are positively correlated.

Extant studies have unveiled two main mechanisms for ambidexterity development, namely structural and contextual mechanism (See Table 1). The structural mechanism has its theoretical root in organizational design (Simsek et al. 2009). Organizations develop ambidexterity by assigning exploitation and exploration to two different business units and integrating them at the higher management level. Each business unit has its own strategy, processes, and incentive systems. Structural mechanism promotes internal consistency, minimizes conflicts and prevents one task from being overshadowed by the other (Benner and Tushman 2003).

However, the structural mechanism can increase the managerial overheads due to the need for coordination and limit the synergies across the two tasks (Raisch et al. 2009). Therefore, the key to a successful structural mechanism is to integrate exploitation and exploration across the two business units. As O'Reilly and Tushman (2004) have explicitly stated, ambidexterity is not merely about putting two divisions under the same roof, but about managing their interactions. Prior studies have unveiled several integration measurements, such as a senior management team with a shared vision (Jansen et al. 2008), asset links between an existing and a new business (Taylor and Helfat 2009), and cross-functional interfaces (Jansen et al. 2009).

Gibson and Birkinshaw (2004) introduce the contextual mechanism as an alternative to the structural mechanism. The two scholars challenge the assumption that exploitation and exploration must occur in two different business units, and suggest that the two tasks can occur in the same business unit, where individuals make their own judgments about how to divide their time between exploitation and exploration. Contextual mechanism has its theoretical roots in organizational culture (Simsek et al. 2009). Instead of creating a dual structure and then integrating them, management's job is to cultivate a conducive context that encourages and enables individuals to balance the conflicting demands in daily operations.

While the contextual mechanism reduces coordination costs and increases synergies between the two tasks (Gibson and Birkinshaw 2004), it introduces the risk of overwhelming individuals, who need to constantly switch between distinct knowledge pools and thinking habits (Raisch et al. 2009). Therefore, the key to a successful contextual mechanism is to empower the individuals. Prior studies have unveiled several empowerment measurements, such as job enrichment that provides employees with training and experience in both exploitation and exploration (Adler et al. 1999), IT-enabled interpretation support systems that enable individuals to make informed decision about when and how to divide the two tasks (Im and Rai 2014), and knowledge mobility that enables individuals to conduct the two tasks simultaneous (Mom et al. 2006).

	Structural Mechanism	Contextual Mechanism
Theoretical root	Organizational Design	Organizational Culture
Strength	Internal consistency; minimal conflicts; protection of exploration	Minimal coordination costs; synergies between exploitation and exploration
Weakness	Managerial overheads; limited synergies	Overwhelmed individuals
Key success factor	Integration of exploitation and exploration	Empower individuals to balance the two conflicting tasks

Table 1: Summary of Mechanisms of Ambidexterity Development

Another dimension important to ambidexterity development is the development paths (See Table 2). In their research, Gibson and Birkinshaw (2004) present the evidence of 'equilifinality' (multiple paths) in attaining ambidexterity (p. 223). While some paths are planned, others are emergent. Organizations engage a planned path toward ambidexterity, when top management devises a plan at the outset and follows it step by step (Gibson and Birkinshaw 2004, p.223). Organizations following a planned path achieve ambidexterity by adopting certain configurations (Raisch et al. 2009, p.688). Examples include configuration of the reward structure (Jansen et al. 2008), the organizational links (Taylor and Helfat 2009), and the IT functionality (Im and Rai 2008).

Organizations engage an emergent path toward ambidexterity, when top management does not have specific plans at the outset and let ambidexterity emerge from the ongoing practice. Organizations following an emergent path achieve ambidexterity by constant adapting to changes (Raisch et al. 2009, p.688). Examples include short-term divide followed by reintegration (Siggelkow and Levinthal 2003), temporary switch between exploitative and exploratory tasks (Adler et al. 1999), and coevolution between the existing and the new business (Du et al. 2013).

	Planned Path	Emergent Path
Theoretical root	Configuration	Improvisation
Strength	Clear instructions, efficiency, coordinated learning	Flexibility, situated response, real-time learning
Weakness	Rigidity	Lack of efficiency and clear instruction
Key success factor	Strategic vision	Ability to adjust and remain flexible

Table 2: Summary of Paths of Ambidexterity Development

Although the mechanism and the path are two primary dimensions that affect the development of ambidexterity, existing literature on ambidexterity development has yet explored their interactions. Raisch et al. (2009) in their review paper of ambidexterity research have explicitly called for more studies on the interactions (p.688).

3 METHODOLOGY

We use a case study as the research methodology. First, case study is strong in exploring new conceptual arguments and our study is explorative in nature (Siggelkow 2007). Second, ambidexterity is deeply embedded in a complex organizational context (Smith and Tushman 2005) and case study affords researchers the opportunity to generate embedded findings (Walsham 1995). We selected six companies at the beginning. Among the six, we chose four, because the initial assessment informed us that that these four companies fell into each of the four categories formed by the two mechanisms and the two paths. All four case companies are leaders in their respected domains, which have recently gone through a transformation. We chose industry leaders, because industry leaders are more likely to be ambidextrous (He and Wong 2004).

The case of China Mobile, China's largest telecommunication provider, is about its transformation toward becoming a green company. The case of Tencent, China's leading Internet company, is about its transformation from a IM (Instant Messenger) provider to a diversified Internet company. The case of Neusoft, one of China's largest IT outsourcing vendors, is about its transformation from a technical service provider to a consulting service provider. SAP Dalian, SAP's captive center in Dalian, is about its transformation from a contact center to a solution center. All four organizations have demonstrated a good balance between exploitation and exploration during the transformation. Their differences in the backgrounds and the domains give us the variety in the cross-case analyses and the opportunity to yield insightful findings (Yin 2003).

Data collection took place between 2009 June and 2014 April. Primary data came from face-to-face interviews. We visited the four organizations multiple times and in total, interviewed 66 informants, 25 from China Mobile, 16 from Tencent, 11 from Neusoft and 14 from SAP Dalian. Each interview session lasted from 45 minutes to 1 hour. Although interview questions were open-ended, they were guided by constructs related to ambidexterity development, in particular the mechanism and the path. To have a comprehensive understanding and to ensure validity of the findings, we selected informants from all ranks, from top management (TM), to middle management (MM), and to junior staff (JS).

To ensure rigor of the case study, a set of stringent measurements were put in place. We designed a case study protocol and created an indexed database. The protocol documented a step-by-step guideline and specific instructions for each step, from case selection and negotiation, to data collection and coding, to phenomenon conceptualization and theorization, and to the final write-up (Pan and Tan 2011). The database stored all the primary and secondary data. With these two measurements, we formed a traceable path of the research process (Olsson et al. 2008, p.263). We also collected multiple interpretations and adopted dialogic reasoning. Multiple interpretations included those from top management, middle management, and junior staff. They prevented the elite bias (Miles and Huberman 1994).

4 CASE DESCRIPTION AND ANALYSIS

Each case description and analysis consist of two parts. The first part covers the transformation background and the second part covers the organization's efforts in developing ambidexterity, in particular the mechanisms they adopt the and paths they follow.

China Mobile is expected to carry out a national strategy of sustainable development. Three decades of fast economic growth have caused China many environmental issues. To address these issues, the central government launched a sustainable development strategy. As a state-own enterprise, China Mobile needed to respond to that call, and it initiated a transformation toward becoming a green company.

China Mobile carried out the transformation via an emergent path that featured incremental changes and bottom-up initiatives. Many informants shared a view that they did not feel any major changes in the daily operations, but over a period of time, they did see major improvements in terms of energy saving and other green initiatives. For example, three engineers of the SMS (Short Message Service) division launched a green application, while they were doing their regular jobs; the application converted news into a SMS and saved thousands of customers from buying physical newspapers. One of the engineers explained, "For everything we do now, we start to think about its green implications and by doing so, many opportunities started to emerge."

Supporting this emergent path was an organizational context that encouraged employees to carry out green initiatives, while maintaining their day-to-day operations. To cultivate this context, the company established a sustainable development office, which was more commonly known the Green Office. Although conflicts between the two tasks were inevitable, top management believed that, the two tasks should not be separated. As a senior manager of the Green Office commented, "Green initiatives should be part of regular operations and if an initiative is separated from the regular operations, it is more like a cosmetic project or a PR (Public Relationship) spin. Many companies do that, but we don't."

Tencent was founded by four college graduates in their dorms in 1998. The company's first product, which is also its flagship product now and the basis of its multi-billion-dollar business, is QQ IM (Instant Messenger). In 2004, QQ became the largest IM product in China with a user base of four hundred million. That year, the company went IPO (Initial Public Offerings) at Hong Kong Stock Exchange. The IPO changed the company's ownership structure. The new investors expected Tencent to diversify its product lines.

Tencent carried out the transformation via an emergent path. Planned actions were limited. In fact, the company refrained from making predictions about the future or setting specific directions on where to expand. As the CEO explained, "The Internet business is changing too fast. Anything beyond six months is unpredictable. Having a plan only locks us in a premediated trajectory that is likely to become irrelevant." Instead, the top management encouraged employees to initiate new ventures. As the president explained, "Product managers and developers are people closest to the market. We let them take the lead and we support them from the back, rather than manage them." For new product development, the company committed resources gradually in case there are unexpected threats and opportunities. "We test the water before jumping into it." Many product managers used this metaphor to explain the rationale for the incremental commitment.

Supporting this emergent path was a dual organizational structure. Although new products were conceived by teams working on existing products, their development took place in a separated team, called a special operational team (SOT). As a Human Resource manager explained the coexistence of regular teams and SOT, "Regular teams are like buses, following a specific route and stopping at regular intervals, whereas SOTs are like police cars, racing to a destination under a tight schedule. The two vehicles cannot be on the same lane." Tencent had two major campuses, one in Shenzhen and one in Guangzhou. While the former hosted many exiting products, the latter was the home to many SOTs. For example, WeChat, a mobile text and voice messaging product that spun off from QQ, moved to Guangzhou, while the QQ team stayed in Shenzhen.

Neusoft was founded by two computer science professors from Northeastern University and their graduate students in a research lab in 1991. The company is now a leading Chinese outsourcing vendor with a major presence in the Japanese outsourcing market. As a former research lab, Neusoft started from software development for Japanese clients, such as the embedded system development for car and electronic manufacturers. The earlier success in embedded system development brought Neusoft more projects from the clients. Many projects were consulting-based, for example the development of an enterprise system and offering an end-to-end IT solution. These projects lacked a set of clear specifications and required Neusoft to engage clients more intensively. The old research-lab management style did not work. Meanwhile, because competition intensified at the software service sector, the company also had the incentive to move up the IT service value.

Neusoft carried out the transformation by putting in place a dual structure that consisted of an onsite consulting team and an offshore technical team. The onsite team comprised ambidextrous members strong in both technical and communication skills. Their job was to work closely with clients to delineate their requirements and devise IT solutions that address those requirements. The technical team comprised polarized members strong in technical skills but weak in communication. Majority of Neusoft employees were polarized, given the company's history as a research lab and its prior focus on technical excellence. This technical team reminded at the backend. In addition to provide technical support to the new consulting services, the technical team was also responsible for maintaining the incumbent software services, which were still the main revenue source during the transformation.

Supporting this dual structure were a series of configurations. This dual structure was a configuration that Neusoft adopted to protect its strengths in technical capabilities and to work around its weaknesses in communication capabilities. As an earlier employee recalled "After a few months in taking on new consulting projects, we knew our engineers were not up to this kind of work and we needed a new model. The top management introduced this dual structure; it not only saved engineers from communication, but also enabled them to contribute effectively to the consulting business." This dual structure was warmly welcomed by existing clients, who acknowledged the enhanced communication quality through the onsite consulting team.

SAP Dalian has clients in more than 120 countries. To support these clients, SAP built many support centers across the world. SAP Dalian was one of the support centres located in Dalian. The city is a home to a large Japanese-speaking population. SAP Dalian started as a contact center to support Japanese clients, who needed information and instructions on how to use SAP products. The contact center achieved high-level client satisfaction by building a strong communication team that consisted of members who could speak fluent Japanese and appreciate the business and social norms of their Japanese counterparts. This earlier success promoted SAP to outsource more sophisticated support tasks to Dalian. In 2004, the top management decided to upgrade SAP Dalian from a contact center to a solution center, which not only answered client calls, but also resolved them.

Unlike Neusoft's approach to separate two tasks into two business units, SAP Dalian expected each individual to handle both tasks simultaneously. This is a challenging task. As a general manager commented, "We are probably taking the hardest job in IT. Our employees need to handle both communication and technical tasks." A senior consultant, who was once a customer representative and now a CRM domain expert, concurred the general manager's statement "In the first few years (of transformation), I slept very little, because I did not have the technical background but was assigned to handle CRM-related matters. Although the task did not require programming, there were a lot to learn."

To achieve this transformation, SAP Dalian carried out a series of configurations. These configurations followed a clear strategy toward building an ambidextrous workforce that consisted of employees who had both communication and technical skills. One configuration was to set up an office in Shanghai so that the company could recruit talents from both northern and southern China. "People with both technical and communication skills are rare in the market. We go extra miles to find them" explained the HR director. The company also sponsored a double-degree program, one in engineering and the other in Japanese, in the best university in Dalian. The sponsorship allowed SAP to recruit students for

summer internship and many stayed after the internship. The HR director explained, "We don't need an engineering degree, but that degree proves that the person has the capacity to attain technical skills."

5 DISCUSSION

As depicted in Table 3 below, the four ambidexterity development approaches derived from our analysis vary in the mechanism that they adopt and the path they follow.

Approach	Mechanism	Path
Partition (Neusoft)	Structural *Evidence: Onsite teams for exploration and offshore teams for exploitation*	Planned *Evidence: CMM for cross-functional coordination and training program to produce onsite consultants*
Hybridization (SAP Dalian)	Contextual *Evidence: high-performance expectation and social support for employees to handle both tasks simultanously*	Planned *Evidence: The development of an ambidextrous workforce strong in both communication and technical skills*
Self-Extension (Tencent)	Structural *Evidence: Special operational teams for exploratoin and regular teams for exploitation*	Emergent *Evidence: Bottom-up initiatives with general guidelines*
Self-Generation (China Mobile)	Contextual *Evidence: Regular assessment on energy efficiency and support for green experiments for employees to handle two task simultaneously*	Emergent *Evidence: Don't rely on specific instructions and let new initaitevs emerge from practice*

Table 3: Four Ambidexterity Development Approaches

Neusoft adopts a structural mechanism in developing ambidexterity. While onshore teams focus on exploring the new consulting business, offshore teams focus on exploiting the exiting software business and providing technical support to the consulting business (Taylor and Helfat 2009). The effectiveness of this dual structure is attributed to a set of planned actions, such as the adoption of CMM to better cross-functional coordination (Jansen et al. 2009) and the large-scale training program to produce sufficient onsite consultants. We label this development approach partition, because the key to this approach is to divide jobs into specialized tasks and coordinate them to achieve greater efficiency (Thompson 1967). This partition approach is consistent with the research on ambidextrous leadership, which suggests that the balancing act should be the task of top management rather than that of regular employees and that regular employees should just receive clear instructions and do not need to hesitate between exploitation and exploration (Jansen et al. 2008; Mom et al. 2009).

SAP Dalian adopts a contextual mechanism in developing ambidexterity. Instead of separating the communication and the technical tasks into two business units, the top management requests every employee to handle both tasks simultaneously. It does so by cultivating a conducive organizational context that consists of high-performance expectation and social support (Im and Rai 2008). The effectiveness of this organizational context is attributed to a set of planned actions as well (Gibson and Birkinshaw 2004). The top management devises a strategy of building an ambidextrous workforce strong in both communication and technical skills and launches a set of specific recruitment and training programs (Garud et al. 2006). We label this development approach hybridization, because the key to this approach is to deliberately place one type of activities into another to form a hybrid (Sanner et al. 2014). Gibson and Birkinshaw (2004) have shown a similar case where a software company deliberately creates a blend of exploitative and exploratory activities (p. 223).

Tencent follows an emergent path in developing ambidexterity. The top management refrains from predicting the future or imposing a roadmap from the top, and encourages teams to propose new business ventures. This bottom-up approach enables organizations to respond to unexpected threats and opportunities, which are common in the Internet business (MacCormack et al. 2001). However, such

bottom-up initiatives should be guided by a structure, because without a guiding structure, these activities degenerate into chaotic behaviors (Brown and Eisenhardt 1998). To this end, Tencent adopts a structural mechanism in developing ambidexterity. While the regular teams are responsible for exploiting existing business, the SOTs, which spin off from the regular teams, are responsible for exploring new ventures. The SOTs are re-integrated with the regular teams when the new ventures grow mature. We label this development approach self-extension, because the key to this approach is to spring off new ventures and bring them back when they grow mature.

China Mobile follows an emergent path in developing ambidexterity. The top management does not make much planning or launch major changes, because how the two tasks contradict and complement each other are unpredictable and there is no precedent to follow. "We are crossing the river by feeling the stones" many China Mobile employees referred to this phrase when they commented on the future plans. The emergent path promotes agile development, because it encourages organizations to start development before the dynamics between exploitation and exploration are well understood (Smith and Tushman 2005). China Mobile's resolute development toward Green-IT affords the company industry leadership and much public recognition (Koenig et al. 2010).

China Mobile adopts a contextual mechanism in developing ambidexterity. The monthly assessment for energy efficiency and the tolerance for failures in green initiatives encourage employees to pursue green activities, while continuing their day-to-day activities (Gibson and Birkinshaw 2004). The organizational context seeds the people and the business processes with generative properties toward green initiatives, such as the sustainable awareness and the green narratives (Starkey and Crane 2003). These generative properties, during the daily interaction of people and processes, enable organizations to transform themselves even as they continue to perform seamlessly on a day-to-day basis (Garud et al. 2006). We label this development approach self-generation, because its essence is to generate new possibility and new ventures in day-to-day activities.

6 THEORETICAL AND PRACTICAL IMPLICATIONS

The study makes several important theoretical contributions to the IS literature. First, as change has become the central theme of the IT industry, transformation has become a regular exercise of successful IT organizations. Although empirical evidence has shown that IT organizational transformation tends to feature coexistence of incumbent business and new ventures (Garud et al. 2006; Taylor and Helfat 2009), research on how to balance the two during IT organizational transformation has been limited. Our study, through the theoretical lens of ambidexterity and based on a comparative case study of four IT organizational transformations, unveils four types of ambidexterity development approaches. This study also makes several important theoretical contributions to the ambidexterity literature. Although prior studies have generated rich discussions on the mechanisms and the paths toward ambidexterity, few have explored their interactions (Raisch et al. 2009, p.688). Our study fills that gap by exploring how the two interact.

The study also has several practical implications. Managers of IT organizations may use our framework to guide their transformation. Managers may compare their organizational contexts with the four case organizations to select appropriate mechanism and path toward ambidexterity. For example, when the incumbent and the new business are loosely coupled and easy to divide, like that in Tencent, organizations may adopt the structural mechanism to separate the two tasks into two business units, and when the two businesses are tightly coupled and difficult to divide, like that in SAP Dalian, organizations may adopt a contextual mechanism that integrates the two tasks in one business unit. Moreover, when the conflicts and synergies between the two tasks are easy to discern and there are precedents for reference, like that in SAP China, organizations may adopt a planned path, and when the conflicts and synergies are difficult to discern and there are no precedents for reference, like that in China Mobile, organizations may adopt an emergent path.

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